with the chimney, a jet of incandescent gas or air will escape with considerable force. What is it that sets this in motion?

Open the bell of a gas producer working with natural draft; the producer gas will escape. What is the force which causes the air to pass through the bed of wood or coal, where it is transformed into gas, and which, in addition, has sufficient pressure to produce the jet of gas?

From the fact that enclosures filled with a cold gas, but one which is lighter than the air, always exert a pressure higher than that of the atmosphere, it follows that the preceding phemonena are due *not to the temperature of the gas,* but to the fact that it weighs less than the air.

Take, for example, a balloon 10 m in diameter, filled with hydrogen (Fig. 11). Compute the hydrostatic pressure of the gas at the top of the sphere. This balloon being open at the bottom, at the level *A A* the gas is in equilibrium with the air, their pressures being equal.

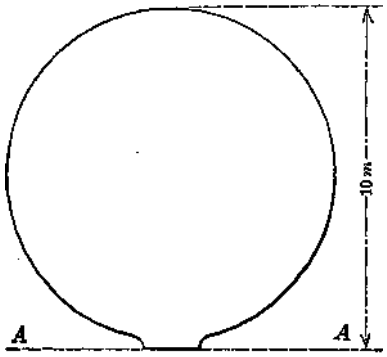

FIG. 11.

Consequently the weight of a column of cold air 10 m in height (1 kg 29 X10 = 12 kg 90) is held in equilibrium by the weight of a column of hydrogen 10 m in height plus a certain hydrostatic pressure 5 which may be determined.

The weight of a cubic meter of hydrogen being equal to 1.29X 0.06927, the following equation is obtained:

$$1.29X10 = 1.29X0.06927X10+5;\ 5 = 12\text{ kg }006,$$

which is in the neighborhood of 12 mm of water.

It is on account of this hydrostatic pressure of the hydrogen at the top of the balloon that it is necessary to employ a very

strong material in the making of this envelope. It is this pressure which causes the balloon filled with hydrogen to ascend and which furnishes the energy for the flow of the hydrogen when the valve at the top of the balloon is opened to permit it to escape. Furthermore, children are often amused by making small hot-air